REMARKS

Claims 1, 2, 5-10, 14-17 and 19 remain pending in the present application with claim 1 in independent form. Claims 3, 4, 11-13, and 18 were previously cancelled. No new claims have been added.

Claims 1, 2, 5-8, and 14 stand rejected under 35 U.S.C. §103(a) as being unpatentable over the article entitled "Plasma Spray Synthesis of Nanomaterial Powders and Deposits" to Karthikeyen et al. in view of Japanese Patent Publication Nos. 11-198281 and 11-256338, both to Bessho. Claims 15-17 stand rejected under 35 U.S.C. §103(a) over Karthikeyen et al. in view of the Bessho references and further in view of PCT Publication No. WO2002/35576 to O'Reilly et al. Claims 9, 10, and 19 have been objected to as dependent upon a rejected base claim, but have been indicated as otherwise allowable.

As summarized in the accompanying Interview Summary, the Applicants conducted a first interview with the Examiner on February 27, 2008, during which additional arguments were discussed to supplement prior arguments that were made against the rejections over Karthikeyen et al. in view of the Bessho references. A brief follow-up interview was conducted on March 26, 2008, at which time the Examiner indicated that the additional arguments were persuasive in overcoming the rejections over Karthikeyen et al. in view of the Bessho references.

While the additional arguments are formally set forth below, the most significant points of distinction were that 1) while the precursors of the Bessho references may be delivered in a "neat" form, the precursors are delivered as a vapor and not as an atomized liquid as claimed in

the instant claims, and 2) Karthikeyen et al. is very clear, in the paragraph bridging columns 1 and 2 on the first page of Karthikeyen et al., that the plasma that is the focus of the article has many special characteristics including high enthalpy density, high temperature, etc. (whereas the plasmas used in the instantly claimed method are non-thermal equilibrium plasmas and, thus, operate at close to room temperature as explained in paragraph [0005] of the instant specification as filed).

Additional Arguments Against the Combination of Karthikeyen et al. and the Bessho References (Detailed)

The additional arguments against the combination of Karthikeyen et al. and the Bessho references are now set forth in further detail. These arguments supplement the prior arguments against combination of these references.

As a first matter, there are significant differences between thermal equilibrium plasmas and non-thermal equilibrium plasmas, and these differences are set forth in detail in paragraphs [0004] and [0005] of the instant application as filed. Karthikeyen et al. is clearly directed to thermal equilibrium plasmas (which are very hot), whereas the plasmas used in the instantly claimed method are **non**-thermal equilibrium plasmas (which operate at close to room temperature).

Secondly, it is noted that the entire premise of Karthikeyen et al. is to present a new technique to synthesize nanoparticles (see the last sentence in the first paragraph of Karthikeyen et al.). As such, it should be noted that under MPEP 2143.01(V.), when a rejection is based on a suggestion or motivation to modify a reference, the proposed modification cannot render the

prior art (i.e., Karthikeyen et al.) unsuitable for its intended purpose. Karthikeyen et al. is clear that the technique taught therein is a plasma spray synthesis (PSS) process that requires use of a high temperature plasma jet to both melt and spray a feedstock which is injected into the plasma flame. While prior arguments have focused on the need to evaporate solvent from the feedstock, it is apparent that evaporation of the solvent is not the only reason why a high temperature plasma is required in Karthikeyen et al. In fact, Karthikeyen et al. (on page 280) indicates that "various phenomena occur" when the liquid precursor is atomized into the high temperature plasma flame, and evaporation of the solvent is merely the first step. Because the proposed modification of Karthikeyen et al. requires substitution of a low temperature plasma for the high temperature plasma of Karthikeyen et al., **and the whole purpose of Karthikeyen et al. is to present a new technique to synthesize nanoparticles that expressly requires a high temperature plasma jet**, such modification of Karthikeyen et al. amounts to rendering Karthikeyen et al. unsuitable for its intended purpose such that the proposed modification is impermissible.

Further, the Bessho references require that vapor be introduced into the plasma rather than liquid. In particular, Bessho '338, in paragraph [0018], teaches that helium gas is bubbled through a container that contains HMDSO (i.e., the liquid precursor that is used to form the films of Bessho '338). The vapor that results from bubbling techniques is different from atomized liquid, which is an aerosol or a fine suspension of liquid droplets in gas. The differences between the manner in which the precursors are delivered (whether in gaseous form or liquid form) is a process variable that one of skill in the art of plasmas would consider when

determining whether or not one type of plasma could be substituted for another, and it is widely accepted that the manner in which the precursor is delivered has different implications for different plasma systems and for different desired end products. In fact, because the precursor in the Bessho references is in a gaseous state, there is clearly no need to evaporate carrier solvents, as is required in techniques taught by Karthikeyen et al.; thus, there is no need for high temperature plasmas in the Bessho references.

While the Examiner has argued that Bessho would make it obvious to use the precursors of Karthikeyen et al. in a "neat" form without solvent, the Bessho references also teach that the precursors are introduced into the plasma in a gaseous state. Karthikeyen et al. provides clear reasons for use of atomized liquid in the process thereof (refer to bullet point 2. on page 276, which describes compositional homogeneity tied to the fact that the liquid droplets processed therein contain precursor chemicals in the same stoichiometric ratios), and there is no teaching to one of skill in the art that use of gaseous precursors would be suitable for the purposes of Karthikeyen et al. It should be appreciated that, when making a particulate as in Karthikeyen et al., such compositional homogeneity may be more important than in barrier film-forming applications such as the applications taught by the Bessho references.

The additional arguments set forth above further support the Applicants' position that one of skill in the art would not be motivated to replace the high temperature plasmas of Karthikeyen et al. with the low temperature plasmas of the Bessho references.

In view of these additional arguments, in addition to the arguments previously made, the Applicants respectfully submit that there is no motivation in the art to combine Karthikeyen et

al. and the Bessho references and that independent claim 1 (as well as the claims that depend therefrom) is both novel and non-obvious in view of the prior art and, thus, in condition for allowance.

It is believed that the instant Amendment is timely filed, and is further filed within the 2-month period for response after a final Office Action. The Commissioner is authorized to charge any additional fees, or credit any overpayments to Deposit Account No. 08-2789 in the name of Howard & Howard.

Respectfully submitted,

HOWARD & HOWARD ATTORNEYS

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Date

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